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tions are that the nebulæ under consideration are capable of developing into something analogous to our solar system, but much more massive than is our solar system.

W. W. Campbell,
November 20, 1916. J. H. Moore.

Recent Improvements at the Lick Observatory.

Minor injuries to a large section of the west outside wall of the main building resulting from the severe earthquake of July, 1911, came prominently to sight in the past winter, and repairs were necessary. Advantage was taken of the situation to combine improvements with repairs. The north room of the main building has up to the present time contained five astronomical clocks. These clocks were of the highest class obtainable at the time of their purchase, three decades ago, but they are now surpassed in excellence by modern clocks. Our chief dependence in recent years has been upon the Riefler constant-pressure clock, mounted on a stone pier within a separate masonry chamber constructed in the basement of the meridian circle house. We have this summer enclosed and given finish to a room of considerable size in that basement, with the Riefler clock chamber in one corner of the room. The Dent sidereal clock and the Frodsham mean-time clock have been moved from the old clock room to a suitable enclosing chamber in the new room. One Hohwü sidereal clock from the old clock room has been mounted in a new protecting case on one of the strong piers in the meridian observing room. The other Hohwü sidereal clock has been transferred from the old clock room to the observers' room at the Crossley dome. The Howard mean-time clock has been moved to a new protecting case near the intersection of the corridors of the main building, where it is in convenient position for members of the staff and community, and where the visiting public may compare their watches. The old clock room has been converted into an astronomer's office. The large office, known to all members of the staff, past and present, as the Assembly Room, has been divided into two offices. The north wing of the main building now contains four large offices, each with two windows. It has always been difficult to heat the old offices on windy days, as the rooms were sixteen feet from floor to ceiling. New ceilings have reduced the height to twelve feet. The switchboard which serves to connect clocks, chronometers, chronographs and observing rooms at the will of the observer, has been moved from the main corridor to a point in the meridian circle room immediately above the new clock room. A new stairway leads directly down from the main floor of the meridian circle house to the entrance door of the new clock room.

W. W. CAMPBELL.

NOTE ON THE SPECTRUM OF THE NEBULA N. G. C. 7293.

In these PUBLICATIONS, **24**, 228, 1912, Dr. H. D. Curtis called attention to an interesting nebula, N. G. C. 7293 ($\alpha = 22^h\ 24.^m3$; $\delta = 21^\circ\ 21'$). The long-exposure photograph made with the Crossley reflector, and reproduced with Dr. Curtis's article, seems to indicate a helical or ring form for this object. Its extreme diameter, including the faint extensions, is about fifteen minutes of arc. It has therefore the largest angular diameter of any ring-form object known.

Considerable interest attaches to the spectral type of this nebula, on account of its great apparent size and regular form. Visual observations of its spectrum were recently made by us with a three-prism spectrograph mounted on the 36-inch refractor. With the slit placed upon the stronger northern edge of the nebula, the bright line of nebulium at 5007A was easily seen, and we were able to glimpse the nebulium line at 4959A. With the slit upon the opposite bright region (the southwest edge) the two nebulium lines were still visible, but very faint.

The spectrum of this nebula is then of the bright-line type characteristic of planetary nebulæ. It may be that N. G. C. 7293 is one of the nearer planetaries to our solar system.

W. W. CAMPBELL,
J. H. MOORE.

Mr. Ferdinand John Neubauer, A.B. 1910 and A.M. 1912 University of Oregon, at present Teaching Fellow in the Berkeley Astronomical Department, has been appointed University Fellow in the Lick Observatory for the second semester of the current year, January to July, 1917.